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ABSTRACT

Recent developments in such fields as linguistics, logic, information theory, computer science, speech act theory, and psychology can lead to a greater interdisciplinary understanding of the process of writing (defined as purposeful activity involving language use in special modes). Purposes for writing, which may be correlated with the many decisions and selections made in the writing act, are different from those of speech and also differ between various writing modes. An adequate writing model will include explicit strategies for making good decisions. Linguistic research has shown that grammar is related to systems of meaning and language use by the establishment of priorities; sentences typically include both previously known and new material, and information priorities within sentences can be analyzed. To plan whole texts, a writer must be trained in forming hierarchies of topics. The writer can make the message as strong as possible by considering reader backgrounds and expectations and by tailoring his or her approach to logical arrangement accordingly. Explicit knowledge of the decision making processes in writing and of the prospective consequences of those decisions is of key importance in writing well; such knowledge is a great part of good style and correct usage. (A recommended reading list is included.) (DF)

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INTERDISCIPLINARY RESEARCH TOWARD A THEORY OF WRITING

Robert de Beaugrande

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There are two frequently encountered views on the future source of a theory of writing suitable for explicit and effective writing programs. Either such a theory will emerge from within the English discipline itself, as an offshoot of the profession's concern with language and (more predominantly) literature; or else a theory must be imported from some adjacent discipline also concerned with language, such as those cited in the title of this paper. My own research in these areas as well as in English leads me to reject both views as inadequate. The theory we need is sufficiently complex that it must be worked out in concerted interaction between English and all of the above cited disciplines -- an interaction free of all the insider's jargon, rivalry, and compartmentalisation that have blocked such efforts in the past.

Only a short time ago, such a vision of interdisciplinary co-operation would have been dismissed on all sides as utopian. But we are witnessing today an unprecedented willingness for co-operation, such that greater and faster progress is occurring in the participating disciplines than was ever possible as long as isolation was the rule. This trend is older and stronger in Europe than America, but here also, such occasions as the Shelter Island Conference (to be discussed below) justify new hopes. My purpose today is firstly to survey the recent advances made possible in adjacent disciplines by inter-disciplinary co-operation and secondly to look at how a theory of writing can be created by this kind of interaction.

At the outset, I must stress that no adjacent discipline has anything like an explicit theory of writing that could be transported to the English class. However, all of them are now aware of the pressing need for such a theory as a means of understanding many of their own special problems. The English profession

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can offer in return its experience with actual writing processes and its insights into literature as an especially effective mode of using language. Therefore, despite the dimensions of the task at hand, I feel that a certain optimism is justified after all.

I shall begin with linguistics, which, being defined as a science of languages, seems a logical starting point. Traditionally, this discipline has been preoccupied with constructing internally consistent formal descriptions of language at a level of abstractness where the issues of human motivation and social interaction could scarcely be raised. Such descriptions were evaluated solely on their formal correctness and not on their usefulness in approaching language-related problems. If some researchers did try to make use of these formal descriptions later, as in so-called "applied linguistics," the theoretical justification as well as the practical results were often rather lacking in substance, at least when the original model was kept rigorously intact.[2]

Transformational grammar will serve to illustrate my point. Its instigators were fond of pointing out that the theory was intended to account for "abstract automatons" rather than people.[3] We are to envision a robot who knows nothing about society and the world and has no desire to communicate meaningful messages, but who is able, by means of a large memory for formal rules, to string together words into grammatical sentences of English. Yet experience has shown that this model is not even usable for the computer. Precisely because our robot knows nothing about the world and doesn't want to communicate, it can only analyze sentences by running through vast quantities of rules.[4] One researcher who developed a transformational analysis model for a computer at MIT calculated that the analysis of a single sentence would demand a time span six times that of the expected life of the solar system.[5]

We begin to understand my point made above concerning the usefulness of

linguistic descriptions. The sociologist Emmanuel Schegloff has been led to conclude that transformational grammar is not about language at all.[6] It can be put to some limited use, as the popular technique of "sentence combining" has demonstrated.[7] But it provides no account whatsoever about why human beings are or are not motivated to combine sentences in actual cases. It is entirely possible that poorly written sentences are not improved by combining.

At present, linguistics is undergoing a long-awaited change. A broad approach known as "text linguistics"[8] is asking the question that old-style linguistics could not answer: what gives a text its "textuality," that is: what makes a text a coherent stretch of discourse and not the mere sequence of minimal units, words, or sentences studied by older linguists? Understandably enough, early research tried to answer the question by staying inside the text. Such aspects were studied as the use of pronouns and other "proforms" that can be substituted for material given elsewhere in the text.[9] Another issue is the distribution of old and new information in sentences, which I shall discuss later on.[10] Recent work reflects the realization that textuality is also determined from outside the text: the coherence of texts is partly derived from the coherence of our views about the real world. Semantics, the study of systems of meaning, and "pragmatics," the study of human motivations and responses in language use, are now emerging from long neglect and isolation to fill in major gaps in language theory.

A significant development in this connection is the rise of a comprehensive science of the use of signs in communication, known as "semiotics." This new discipline is devoted to investigating all kinds of communication, including speech, writing, imagery, gestures, and facial expressions. Such a broad and unified approach has already brought notable advances in such diverse areas as social psychology and the theory of artistic media. The extent to which

semiotics can be a complete success depends directly upon the willingness of the relevant disciplines to continue and intensify their participation.

The brief outline of linguistics just provided can be seen as typical of the state of the art in other areas also, such as logic, information theory, and psychology. Like linguistics, these disciplines traversed barren periods of isolation and narrow-mindedness, only to discover recently that even their most basic tenets are only to be stated and proven through free consultation with adjacent disciplines.

Logic, which has traditionally formed a central part of language philosophy, has largely been concerned with constructing systems of meaning in which objects are fully definable and describable through consistent operations, and in which all assertions formed by such operations can be unambiguously classed as true or false. Predicate logic deals with the internal construction of assertions, while propositional logic deals with the truth values of assertions in various combinations. The rules and operations allowed in conventional types of logic are kept very stringent in order to eliminate all possible ambiguities in advance. As a result, such logics are unsuited to representing statements made in "natural languages" (i.e., real languages such as English) about the world around us with its many nuances and ambiguities. The situation has been similar to that of transformational grammar, in that the stringency of the system tends to vitiate its usefulness as an account of language.[11]

One might compare logic to a system of measurement that uses only feet and inches. Objects and distances which are not exactly measurable in these units are simply rounded off or ignored. The task of recent logicians has therefore been to find more exact and flexible units for representing some model of the real world. In <u>modal logic</u>, assertions do not simply possess a value of either true or false, but instead a degree of probability at a

given time point.[12] Other developments concern the concept of the function, which is defined as an entity that assigns one element to another. Functions can be used to assign properties to objects and thus to reconstruct whole states of affairs or "possible worlds." Richard Montague has proposed a much richer system for the formation of functions. If an object is assigned a property, a new function could be used to assign a property to that property and so on, until the desired precision and detail is attained. In this way, logical representation becomes a very accurate scale of measurement in comparison to its early insistence upon forcing everything into cumbersome patterns. Montague's system also captures the details of situations by defining "time-world-states" where certain conditions prevail.[13]

An intriguing example of interdisciplinary co-operation between logic, information theory, psychology, and computer science is the development of a computer teacher using the Socratic method. Induction, being the process whereby one inspects some actual instances and attempts to construct a rule, is an important component of a theory of writing. The object is not so much to construct a perfect and complete rule system as to acquire strategies for forming rules and revising them when contradictions appear. These strategies are essential for presenting convincing and consistent arguments with examples. The computer system, called SCHOLAR, can use virtually any subject matter to train a student in making and defending or revising predictions on the basis of observation.[14]

Speech-act theory has been another major area of interdisciplinary interaction, this time between logic, linguistics, and sociology or "socio-linguistics" (as the borderline region between the two latter disciplines is often called). This theory deals with conventions and actions which can be counted as constituting the social acts of making promises or threats, giving advice, and so on.[15] So far, the theory has

been most successful in treating such clearly defined uses of language as the above or in ceremonies such as baptism, marriage and the like. More intense participation is needed among a wider group of disciplines, including psychology in particular.

The question of how systems of meaning are correlated with conventions of language use is too large to be handled by speech-act theory alone. This is evident in the matter of information value. It is not enough to simply represent a state of the world in a logical form. We need to know how people take this state as a background and make a new or important statement about it. In other words, we must find out how some information is focussed and other information kept marginal.

The original conception of information theory[16] was to determine the information value of elements by reference to their probability of occurring in a given sequence. A highly probable element is said to carry little information and vice versa. This seems reasonable enough, but problems arise when probability is viewed as computable only when the exact number of alternatives for any point is known. The alternatives in a natural language like English are very numerous, and they are seldom freely interchangeable. Moreover, when readers encounter highly improbable elements in texts, they are less likely to be highly informed than totally mystified. What we really require is a comprehensive account of the various factors that influence the expectations of readers about texts. Only then can we speak of an element as probable or improbable in a communicative sense.

The need to judge reader expectations and responses demands consultation with psychology. This discipline is also emerging from a long phase of isolation during which very mechanical experiments based on reductionist theories were the rule. The experts at the conference on learning psychology on Shelter Island, whose proceedings are a must for every English teacher, were in

impressive agreement about "the past irrelevance of psychology to the educational enterprise."[17] The usual testing methods for language experiments involved recall of nonsense syllables and words lists, two forms in which real-life language never occurs. Later, transformational grammar stirred interest in sentence formation, but only considerations of syntax were allowed. To prevent test persons from consulting other cues, such as context or voice quality, experimenters presented samples of single sentences spoken by people in a dead monotone or else a shrill, unvarying scream.[18]

Only recently have tests begun using coherent texts read under more natural circumstances. Rather than the single word or the grammatical pattern, the basic unit is often a logical assertion, that is, an object and some property. This co-operation of logic with psychology has already allowed the design of a useful standard to measure readability.[19]

Another new element in psychological studies is the realization that language is not just a matter of responding to outward stimuli. Language users have complex frames of knowledge, belief, and experience which they use to predict what will be said and how things should be interpreted. Tests which assume test persons with blank minds are unrealistic, and any accurate results they might achieve are artifacts of the efforts of people to be good "test persons" in the expected way.[20]

A major impulse in the development of artificial intelligence models came from the desire to find models of how people stored knowledge about the world. The very conception of artificial intelligence as a field of techniques for machine comprehension has made it an eminently interdisciplinary and hence rapidly progressing area of research. The most intriguing aspect of computer models is their demand for a much more explicit model of understanding than any available so far. Such models must be realistic in the very sense that

traditional linguistics and logic were not, because otherwise the model will simply not run on the computer. Therefore, artificial intelligence provides a rough proving grounds for language theories of all kinds. I remarked already that the weakness of transformational grammar was clearly shown in attempts to computerize it. In contrast, Terry Winograd was able to get a robot working quite well with a "functional grammar" suggested by Michael A.K. Halliday.[21] The computer also verifies logical systems for representing "possible worlds" by such techniques as mechanical theorem proving. And the interest of psychologists in artificial intelligence was very manifest at the Shelter Island conference.

The input to the computer is first of all a sequence of symbols in a mechanically readable form. The simplest system uses a grammatical analyzer and a dictionary to understand the input. But this kind of system is often helpless for dealing with ambiguities resulting from the simple fact that one word can be used to mean different things. Assigning markers to words for compatability tests did not help much.[22] What is needed is to create inside the computer a body of knowledge capable of solving common problems of ambiguity by making inferences from context. In addition to a grammar and a dictionary, researchers have developed networks of knowledge, often called "frames,"[23] which enable the computer to understand messages about limited models of the world. The computer can infer more facts than it is actually given, and create or update states of affairs. Factfinding and inference procedures readily solve many kinds of ambiguities quite beyond the reach of purely grammatical systems. Here we have a striking confirmation of the conclusion reached independently by linguists: the coherence of texts depends on the coherence of our understanding the world.

Having come full circle, I would now like to suggest how the disciplines I have briefly surveyed might interact in the development of a theory of writing.

To begin with, we can define writing as a purposeful activity involving language use in special modes. We must go on to inquire how purposes should be defined and correlated with the many decisions and selections that must be made during the act of writing. Decision-making criteria must reflect the fact that the options and the potential of writing differ not only from those of speech, but vary also for different text types. It might seem desirable to begin with an exhaustive presentation of the options, but this will soon prove unworkable. Instead, we need general standards which allow the writer to determine the suitability of actually appearing options (i.e., options coming to mind) for the text type at hand. For example, topic shifts in expository writing must be controlled with much stricter means than in face-to-face speech or a personal letter. Expository writing also demands much greater attention to possible ambiguities, due to the relatively large distance between writer and reader.

The options in such areas as topic choice and arrangement, hierarchies of detail, strategies of argumentation, sequences of presentation, and grammatical structure are too numerous to be mananged all at once. It follows that we need management strategies for making decisions in a suitable order, so that contingencies can be respected. For instance, one must decide whether the agent or the recipient of an action is to be given prominence before choosing the active or the passive form of the verb.[24] My own experiments indicate that the best time for co-ordinating decisions is not during the act of writing, but after one has written a relatively complete stretch of discourse. It is not surprising and certainly not degrading to notice that many initial decisions were not the best possible, and to revise them accordingly. This effect is a simple result of the complexity of the task.

It should be stressed that a model with explicit strategies for making good decisions is well worth the initial difficulties of designing it. For

one thing, we would have a systematic and eminently fair standard for assigning grades to student performance. What is still more important, students would have direct knowledge of performance standards, so that they would be motivated to evaluate and revise their own work extensively before submitting it in the first place. The rather unproductive cycle in which teachers simply mark and count whatever are considered "errors" would be replaced by a co-operative discussion of teachers and students about how to use manifest principles for building and judging texts. Human resources would be employed much more effectively, both in dramatically reducing teacher work loads and in openly promoting student self-sufficiency.

The contribution of linguistics to an explicit theory of writing is very important. Linguists have already provided a formal descriptions of the grammatical and syntactic options of English. Research is now in progress concerning the relationship of grammar to systems of meaning and language use. One major factor that pervades all considerations of communicative functions is the establishment of priorities. The typical sentence contains some material which refers either to what has been said before or else to what the readers presumably know; and some material which is important either because it is new or because the writer wishes to call it to the focus of the readers' attention. The most usual arrangement for English sentences is old (or obvious) information followed by new (or strategically important) information.[25] However, information priorities are not to be analyzed only within sentences. Accurate judgements about reader background and expectations are indispensible. If a writer focuses on material already known to the readers, the act of reading loses its dynamic effect. In a writer wrongly presupposes extensive background knowledge, the text may not be understood at all, as is the case of technical writing

when presented to general audiences. A certain range of ratios between old and new information is advisable for a given reader group, while ratios falling too low or too high run the scale from utter confusion to sheer boredom. Psychological tests with alternate versions of the same text, each version having a characteristic information ratio, would be very instructive.[26] We also need studies from the areas of pragmatics and socio-linguistics dealing with issues of motivation and response among readers with particular interests.[27]

To plan whole texts, a writer must also be trained in forming hierarchies of topics. Logical systems for organizing the relationships between a central thesis and the supporting facts or illustrations must be refined. These systems must not be restricted to logical considerations alone, but must be correlated with such systems for managing linguistic options and judging reader responses as I have outlined above. For example, if a writer's purpose require imparting a highly unexpected message, the decision to present that message at once and follow it up with supporting material (the deductive approach), or to begin with seemingly incidental material and build up to the message as a conclusion to be drawn (the inductive approach) depends on presumed reader attitudes. If the message is likely to encounter resistance or rejection, the inductive method is better, while the deductive method is effective for messages that will be approved. The writer can thus take advatange of reader predispositions to make the message as strong as possible.[28] Depending upon which of these approaches is chosen, the information contours and hence the grammatical formation of the individual sentences will be substantially affected.

Reader responses can also be studied in analogy to artificial intelligence models. When new information is introduced into a system, does the system reject it, transform it, or update its own knowledge by discarding old facts? The

response should depend upon how many items of information in the system are attached to whatever items would be discarded or updated, and how strong the motivations to preserve the old order may be. The system need not insist upon complete logical consistency, any more than humans do. But the system would hardly tolerate large contradictions between items closely linked in the network. Research is now under way to study how networks of meaning function in processes of understanding and interacting.[29]

In teaching writing, it is important to remember that texts are also situated in networks of previous texts. This factor has been studied in semiotics under the name of "intertextuality."[30] Here is where the English profession's expertise in literature and literary influences become active. The most important use of literature here would be to show how the creativity of authors results from an awareness of the background of intertextuality and an acceptance of the implied challange to discover new possibilities.[31]

Explicit knowledge about the decisions made in writing and about the prospective consequences of those decisions is surely a key factor in writing well. Such knowledge has a great share in what has traditionally been described as "good style" and "correct usage." Obviously, more time is needed to develop a sufficiently complete and explicit account for wide use in teaching writing. But we can make significant inroads on this large task with the help of other language-oriented disciplines. I hope that I have at least suggested what these disciplines can offer and what some areas of future co-opertaion might be.

Notes

[1] Presentation at the MLA Division on the Teaching of Writing, Chicago, December, 1977.

[2] One expensive boondoggle of this kind is the foreign language laboratory inspired by structural linguistics and behaviorist learning theories.

[3] Cf. the opening remarks in Noam Chomsky, Aspects of the Theory of Syntax (Cambridge: MIT, 1965).

[4] The astronomical expense of time and energy resulting from this factor is called "combinatorial explosion" in the industry of computers. Concerning the 'performance' of transformational grammar, see Winograd, Understanding (reading list), p. 42, and his reference to the Woods report.

[5] S. Petrick, A Recognition Procedure for Transformational Grammars (Cambridge: MIT, Diss. 1965)

[6] Personal communication, 1977.

[7] Many newer works on sentence combining make little reference to Chomsky's original grammar, but their samples make the kinship very apparant, even -- in some cases -- right down to the insipid quality of the resulting sentences.

[8] See the suggested works on the reading list: Dressler/Beaugrande, Introduction, van Dijk, Text, and Halliday/Hasan, Cohesion.

[9] A very complete account of such devices in English is given in Halliday/Hasan, Cohesion.

[10] See especially the chapter "New and Old Information" in Chafe, Meaning.

[11] This charge has been recently raised by the eminent German psychologist Hans Hörmann, Meinen und Verstehen (Frankfurt: Suhrkamp, 1976).

[12] Cf. G.E. Hughes and M.J. Cresswell, An Introduction to Modal Logic, London: Methuen & Co., 1968).

[13] Montague's system is presented only in the very technical book: Richard Montague, Formal Philosophy (New Haven: Yale, 1974). However, an accessible introduction is now in preparation by David Dowty, Robert Wall, and Stanley Peters.

[14] See the contributions by Collins in Anderson/Spiro/Montague, Schooling, pp. 339-63 and in Bobrow/Collins, Representation, pp. 383-415.

[15] See John R. Searle, Speech Acts (London: Cambridge, 1969).

[16] The first version is the highly technical: Claude Shannon and Warren Weaver, The Mathematical Theory of Communication (Urbana: University of Illinois, 1949).

[17] The proceedings of the Conference appear on the reading list under Anderson/Spiro/Montague, Schooling. This quote is on p. 61, and is due to Andrew Ortony of the University of Illinois.

[18] This description is derived from my own experiences with the testing material of Thomas G. Bever of Columbia, a devoted Chomskian.

[19] See Kintsch, Memory (reading list).

[20] For an experiment which finally met this problem, see the contribution of Rand J. Spiro in Anderson/Spiro/Montague, Schooling, pp.137-65.

[21] Winograd, Understanding (reading list).

[22] The suggestion was advanced by Wayne Tosh, "Translation Model with Semantic Capability," Linguistics, 55 (1969), pp. 56-69, but I can find no record of its ever having been run on a computer.

[23] See the contributions of Minksy in Winston, Psychology, pp. 211-80, and Winograd in Bobrow/Collins, Representation, pp. 185-210.

[24] See my remarks in "Generative Stylistics: Between Grammar and Rhetoric," College Composition and Communication, 28/3 (October, 1977), pp. 240-46.

[25] See note 10. This aspect of language study was developed in Czechoslovakia years ago, but was ignored by American linguists until recently. See now Frantisek Danes, Papers in Functional Sentence Perspective (Prague: Academia, 1974).

[26] I shall propose tests of this kind at the University of Colorado at Boulder, where Walter Kintsch is working.

[27] For an interesting study of this kind, see H.R. Kearney, Personal Involvement and Communication Context in Social Judgement of a Controversial Issue (University Park: University of Pennsylvania, Diss., 1975).

[28] In essence, this strategy follows proposals by Rogers discussed in Richard Young, Alton Becker, and Kenneth Pike, Rhetoric: Discovery and Change (New York, Harcourt, Brace, and World, 1970).

[29] See the contribution of William Woods in Bobrow/Collins, Representation, pp. 35-82.

[30] See Julia Kristeva,"Problèmes de la structuration du texte," Linguistique et littérature, 12 (1968), pp. 55-64.

[31] See my remarks in "Literature and Technical Writing," a lecture at the California Polytechnic State University, May 1977 (Ohio State University, mimeo).

Suggested Reading

The works in this list are general enough in their presentation that people outside the discipline can read them. Requests for reprints of works by the present author (including this paper itself) will be honored as far and as soon as possible.

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(further material in van Dijk, Text, and Beaugrande/Dressler, Introduction.)

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